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MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2017/2018

**TDB2111 – Database Systems /
TIS1101 – Database Fundamentals**

(All sections / Groups)

16 OCTOBER 2017
9.00 a.m - 11.00 a.m
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of 6 pages, including the cover page, with FOUR questions only.
2. Attempt **ALL** questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please write all your answers in the answer booklet provided.

Answer ALL Questions**QUESTION 1**

(a) *Hanna.co* is an online florist that focuses on selling and delivery of flowers. It offers specific bouquets of flower arrangements for selection. Each bouquet is named uniquely. For instance, the bouquet named *Camelia* consists of carnation and roses, while *Kayla* consists of daisies and roses.

Based on the following business rules, draw the ER diagram for *Hanna.co*. The ER diagram is used as the internal model for *Hanna.co* for its online system. The ER diagram should be complete with entities, primary key, foreign key (if any), relevant attributes and relationships.

- Currently *Hanna.co* has 40 bouquets for selection. Each bouquet is named uniquely. Every bouquet has different pricing. For example, *Camelia* costs RM89 and *Kayla* costs RM99. Every bouquet contains between two and four types of flowers.
- Every flower is identified uniquely using FlowerID. Each flower is recorded with its name and colour. For instance, FL1001 is for pink rose and FL1002 is for red rose. Each flower may be used in more than one type of bouquet.
- Every customer must register in order to make orders. Each customer is registered with a unique UserID, name and contact. A customer makes any number of orders.
- Each order made by the customer is given a unique OrderCode. Each order contains one bouquet. The delivery date, address, recipient's name and contact must be specified when an order is made. Customer may choose to pay using credit card or online banking. Delivery is provided free.
- *Hanna.co* has 10 dispatchers currently. Every order is delivered to the recipient by a specific dispatcher. A dispatcher will normally deliver at least one order per day.

[8 marks]

(b) *Hanna.co* owners aspire to grow their business and improve their services. To do so, they segment their customers into *Premium* customers and *Standard* customers. Each premium customer has their own discount rate while each standard customer has a special rate. Based on your solution in Q1(a), revise the ER diagram to reflect this new relationship. You do not need to re-draw the entire ER diagram. Show only the ER diagram part that indicates this new relationship.

[2 marks]

Continued

QUESTION 2

Answer questions (a) to (c) based on the following relational schema. The primary key for each relation is in bold and foreign key is underlined.

CAR (**CarID**, PlateNo, TypeID)

OWNER (**OwnerID**, Name, Contact, Address)

TYPE (**TypeID**, Model, CubicCentimeter, Manufacturer)

CAROWNER (OwnerID, **CarID**, DatePurchased, PurchasedPrice)

(a) Assume that CAR and OWNER tables have been created, write the SQL statement to create CAROWNER table. Create the attributes for the table with relevant data types.

[3 marks]

(b) Write a SQL statement to list the owner name who purchased a car manufactured by *Honda*.

[3 marks]

(c) The table below show some sample records in CAR, TYPE and CAROWNER tables.

Answer questions (i) and (ii) based on the following tables:

CAR

<u>CarID</u>	PlateNo	TypeID
C1	WWW1	T2
C2	VAH777	T3
C3	QTE9	T2
C4	BEN22	T4

TYPE

<u>TypeID</u>	Model	CubicCentimeter	Manufacturer
T1	Vios	1500	Toyota
T2	Camry	2000	Toyota
T3	Accord	2000	Honda
T4	MyVi	1300	Perodua

Continued

CAROWNER

OwnerID	CarID	DatePurchased	PurchasedPrice
O1	C1	Oct 31, 2016	75000.00
O2	C2	Oct 10, 2016	150000.00
O3	C3	May 21, 2015	150000.00
O1	C4	Apr 22, 2014	41000.00

i. Write a SQL statement to calculate the total number of cars purchased for each car type. The results of your SQL should only list the car type that has a total number of cars purchased greater than 50 and purchased price above 80000.00. An example of SQL output as follows:

TypeID	Total
T2	55
T3	60

[2 marks]

ii. Write a SQL statement to calculate the total amount spent on car purchased by each owner from year 2014 to year 2016. An example of SQL output as follows:

OwnerID	TotalAmountSpent
O1	116000.00
O2	150000.00
O3	150000.00

[2 marks]

Continued

QUESTION 3

Answer questions (a) and (b) based on the following table:

AnimalID	AnimalName	AdopterID	AdopterName	AdopterAdd	DateAdopted	ChipCode
A1	Patch	AD100	James	123, George Street, KS	Sept 21, 2014	CX0001
A2	Kenix	AD101	Maria	8 Blue Street, WA	May 6, 2015	CX2320
A3	Candy	AD101	Maria	8 Blue Street, WA	Jan 30, 2015	CX2319
A4	Geo	AD102	Jane	43 Macalister Street, PN	Apr 14, 2016	CX9843
A5	Mann	AD103	Julles	973 Union Rd, DW	May 6, 2015	CX0057

**ChipCode is a number on the microchip that is implanted on the animal for tracking by the adopter. ChipCode is only assigned after an animal is adopted.*

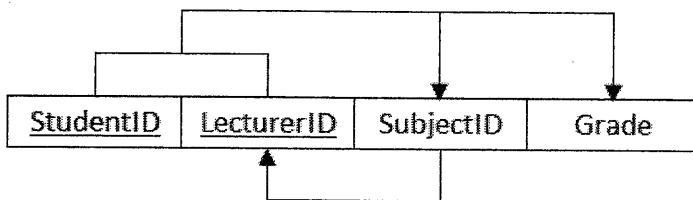
(a) Draw the dependency diagram in 1NF for the above table, showing all dependencies. Underline the primary key.

[3 marks]

(b) Based on your solution in Question 3(a), normalize the relations to 2NF. Underline the primary key.

[3 marks]

(c) The following shows a dependency diagram in 3NF but not Boyce-Codd normal form (BCNF):



Normalize the relation above into BCNF. Show the resulting dependency diagram.

[4 marks]

Continued

QUESTION 4

(a) Explain the difference between operational data and decision support data. [3 marks]

(b) List FOUR characteristics of Internet technologies. For each Internet characteristic that you have listed, give ONE benefit. [4 marks]

(c) Discuss any THREE factors that affect DBMS software selection. [3 marks]

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